

FERMENTED WINE MADE FROM FRUITS OF ARALIACEOUS SHRUBS,
AND METHOD FOR PRODUCTION THEREOF

TECHNICAL FIELD

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The present invention relates to fermented wine made from fruits of dicotyledonous deciduous shrub or latifoliate shrub in the family *Araliaelata*, particularly to fermented wine made from fruits of
10 *Acanthopanax sessiliflorus* or *Eleutherococcus senticosus* as main material and a process for preparation thereof.

BACKGROUND

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Acanthopanax sessiliflorus and *Acanthopanax senticosus* (or *Eleutherococcus senticosus*) are deciduous and broadleaf shrubs in the family *Araliaelata* like ginseng. Especially, *Acanthpanax*
20 *senticosus* resembles the wild ginseng in the shape and is also called as Siberian ginseng in Russia, America and Europe. *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* are distributed around Baekdu mountain in North Korea covering Manchuria, Maritime Province of
25 Siberia, alpine belts of Korea and the northeast region of Hokkaido, Japan. Often, they may grow wildly in the restricted area including Asian countries over 40°

north latitude or hilly area over 600 ~ 1,000 m above the sea level.

The *Acanthopanax* sp. shrub attracts global attention as a novel medicinal herb, since it has no toxicity in the whole tree and also has the broad range of pharmaceutical efficacy. In the Olympic Games, the players of the old Soviet Union have increased records after administering *Acanthopanax* sp. herb. In 1986, it is also disclosed in the scientific journal, *New Scientist* that a number of people including explorer, astronomer, soldier and the like often took *Acanthopanax* sp. to enhance the physical strength and the intensive power highly. Therefore, *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* become a public concern on account of these effects.

Acanthopanax sessiliflorus or *Acanthopanax senticosus* has been already elucidated to contain acanthosides having the most outstanding activity biologically and other useful constituents.

For a long time, *Acanthopanax sessiliflorus* or *Acanthopanax senticosus* has been known as an herbal plant to improve the personal health and investigated in various aspects regarding its constituents and efficacies. These herbs are identified by such a research to affect the congenital and specific immune system in the living body of human being and to enhance the anti-bacterial activity and the anti-tumor activity.

In addition, *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* include not only glycosides such as Acanthoside B and D and soluble polysacchrides enhancing the immunity in a large amount, but also
5 Sylrgin, cumarin and the like as a glycoside in their roots. The above-mentioned Acanthosides are illustrated to have a remarkable effect upon the hematosiis of bone marrow, since they may stimulate the RNA synthesis. The soluble polysaccharides have been demonstrated to
10 promote the leukocyte because they may increase the number of macrophage.

Hence, *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* can activate the function of living body and be effective upon autoimmune diseases.
15 They are also a good restorative if administered for the patient lacking in spirit and energy.

On the other hand, *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* are collected in the period between summer and autumn and dried in roots and barks,
20 which is called as "Ogapi" or "Ogalpi". "Ogapi" has been used for a sort of medicine in ancient times and is known to treat the stroke or the weak constitution traditionally as Oriental medicine, since it contains various components advantageous for human being as
25 described above.

Furthermore, Ogapi can be a material to manufacture wine and these wines are referred to as "Ogapi wine" or "Ogalpi wine".

Precisely, the root coat and the bark (namely "Ogapi") derived from *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* tree are well washed by using water, dried, cut to pieces in 2 ~ 3 cm of size, poured into a container, soaked by adding liquor and sugar and fermented. Then, the container is stored at cool temperature for about 1 ~ 3 months to extrude effective components of Ogapi by alcohol. For a long time, Ogapi wine manufactured by the above-mentioned procedure has been an invigorant and is reported to be highly effective on lumbago, numbness in hands and feet, hemiplegia and the like.

Recently, some processes of preparation functional beverages and alcohols have been developed by using a tree such as *Acanthopanax sessiliflorus* and *Acanthopanax senticosus*. In detail, it is disclosed in Korean Patent Application Laid-open No. 1999-001026 that the sport drink for replenishing water and electrolytes can be manufactured to add *Acanthopanax* sp. extract to existed beverage. In Korean Patent Application Laid-open No. 2002-24775, the process for producing liquor is also demonstrated, which comprises steps: (A) extracting Oriental herbes such as *Acanthopanax sessiliflorus* by using the mixture of

sugar and citric acid; and (B) mixing alcohol and distilled water, filtrating and fermenting under Commercial Code.

Meanwhile, it is identified that Acanthoside D is
5 found in a large amount from fruits of *Acanthopanax sessiliflorus* and *Acanthopanax senticosus*, although it is reported to be mostly included in roots. Chiisanoside as a secotriterpenoid glycoside also exist in these fruits even if it often be contained
10 only in leaves of a certain *Acanthopanax* species. Furthermore, the pharmaceutical efficacy of Chiisanoside is investigated by using MTT analysis for anticancer activity, renal toxicity and the like. It is verified that these fruits contain approximately 10-
15 fold content of glutamate than common crops.

Presently, the roots and barks of *Acanthopanax sessiliflorus* and *Acanthopanax senticosus*, so called as "Ogapi" are illustrated to have the traditional effect and use and thus adopted widely, but the fruits of
20 trees are left or discarded in practice.

Hence, it is necessary to explore how to use the fruits of *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* efficiently, to exploit various effective constituents and further to find out how to increase
25 the income of farmhouse by using the very fruits.

DISCLOSURE OF THE INVENTION

The present inventors have observed that *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* include several sorts of functional sugars in fruits a lot and attempted to develop novel fermented wine which is distinguished from conventional Ogapi wine prepared by alcohol extraction, has the more outstanding sense to drink by fermenting fruits and can sustain various useful constituents of these fruits.

Therefore, the object of the present invention is to provide fermented wine made from fruits of *Acanthopanax sessiliflorus* and/or *Acanthopanax senticosus*.

Another object of the present invention is to provide a process for production of fermented wine made from the fruits of *Acanthopanax sessiliflorus* and/or *Acanthopanax senticosus* as main material.

The other object of the present invention is to provide a process for production of fermented wine made from the fruits of *Acanthopanax sessiliflorus* and/or *Acanthopanax senticosus* as main material, in which *Rosa davurica* extract and *Rhynchosia nolubilis* extract are added to improve the functional property and the product quality of the fermented wine.

In order to attain the above-mentioned objects,
the present invention provides fermented wine made
from the fruit of deciduous shrub or latifoliate shrub
in the family *Araliaelata* as main material. Preferably,
5 the shrubs in the family *Araliaelata* are *Acanthopanax*
sessiliflorus and *Acanthopanax senticosus*.

The present invention provides a process for
production of fermented wine, which comprises (A) step
for preparation of fermented solution; (B) step for
10 fermentation; and (C) step for stopping the reaction.

In order to improve the functional property and
the product quality of fermented wine described above,
Rosa davurica Pallas extract and *Rhynchosia nolubilis*
extract can be added before fermentation. Preferably in
15 said step for preparation of fermented solution, the
water extract obtained from 0.05 ~ 0.25 kg of *Rosa*
davurica and/or the water extract obtained from 0.05 ~
0.25 kg of *Rhynchosia nolubilis* can be added in 1 kg of
dry weight of the fruits.

20 The shrub of *Rosa davurica* smells good in
flowers and is used for source material of perfume.
Especially, it is elucidated that the root be highly
effective on the cancer treatment and the prevention of
aging as well as the leaf and the fruit contain a large
25 amount of vitamin C. Therefore, *Rosa davurica* is an
outstanding herbal plant to prevent and treat adult
diseases. It is confirmed in several research

institutes including Science Institute of Natural Herbs that *Rosa davurica* contain 20-fold vitamin C (for example, 1,072 mg per 100 g) in the fruit more than lemon.

5 *Rhynchosia nolubilis* is an herb product in the Korean, is edible and has a remarkable efficacy as medicine. From ancient, *Rhynchosia nolubilis* is called as "drug bean" due to the medicinal use and precisely, it has the highest efficacy among beans, detoxifies
10 strongly, prevents all kinds of diseases and recovers the damage of human tissue rapidly. Especially, *Rhynchosia nolubilis* is reported in a number of Oriental herb documents to have a medicinal effect on diabetes and to improve the renal function. Recently,
15 it is soaked in vinegar to make a sour bean and taken to prevent and treat constipation and adult diseases. In addition, it is illustrated in the ancient document that the drug bean confers a clear and better eye view when eaten in raw material.

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In order to attain the above-mentioned objects, the present invention provides a process for production of fermented wine as follows.

Precisely, above all in (A) step for preparation
25 of fermented solution, 1 ~ 20 L of pure water is added in 1 kg of crude fruit from deciduous shrub or latifoliate shrub in the family *Araliaelata* and

adjusted to 10 ~ 35° Brix by dissolving sugar. Then, in
(B) step for fermentation, yeast is inoculated into the
fermented solution and fermented at the range of 20 ~
30°C. After the resulting solution reaches a proper
5 stage of fermentation, (C) step for stopping the
fermentation is proceeded. The fermented solution is
treated to stop the reaction by adding some chemical
agents such as ammonium phosphate or potassium sulfate
in a proper amount, or by incubating under a low
10 temperature at the range of 0 ~ 5°C so as to
manufacture the fermented wine of the present invention.

At this moment, if necessary, several additional
steps can be performed as follows. In (D) step for
filtration, the fermented solution is filtrated after
15 stopping the fermentation and in (E) step for
maturation of the fermented solution, the fermented
solution filtrated above is maintained to mature under
a low temperature at the range of 10 ~ 25°C.

In the present invention, the fermented wine is
20 supposed to have a good sense of beverage in the range
of 10 ~ 20% of alcohol content and to ferment
approximately 50% of the sugar content. Preferably, the
fermented solution is maintained at the range of 20 ~
30° Brix in the (A) step for preparation of fermented
25 solution. Any kind of sugar can be added if it can be
fermented in yeast strains. Preferably, the sugar can
be selected among glucose, fructose, sucrose, maltose,

glutinous starch syrup, molasses, starch (for example, rice or rice powder) and the like. More preferably, sucrose can be used since it may be purchased and managed conveniently. Also, honey can be used as sugar additive instead of sucrose to improve the functional property, although the experimental data is not depicted.

Preferably in the (C) step for stopping the fermentation, the fermented solution is treated to stop the reaction, when the alcohol concentration reaches 10 ~ 15%.

Preferably in the (A) step for preparation of fermented solution, crude fruit is used in an intact state. Further, the fruit can be reduced to powder before use, used only in the flesh after removing the core of fruit or squeezed to utilize only juice, depending upon requirements.

On the other hand, it costs much to collect and store the natural fruits of *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* in an intact state and to transfer the fermented wine already manufactured in factory, since they grow wildly in the mountainous region or are cultivated in remote farms. Therefore, it is recommended that the fruits should be dried (for example, dried in the wind, dried under light, dried under shade, dried by heat, lyophilized or the like), after collected in the mountainous region and utilized

to prepare the fermented wine of the present invention. Depending upon requirements, the fruit can be crude fruit in an intact state, further reduced to powder before use, used only in the flesh after removing the
5 core of fruit or be extracted in a dried state by using essential oil.

In the present invention, any yeast strain can be used if it produces alcohol by the fermentation. Preferably, yeast used for grape wine, for bread, for
10 traditional liquor (so called as Nooruk) or the like can be adopted. More preferably, yeast is pre-cultivated in the small aliquot of fermented solution and then, inoculated to the total fermented solution, since yeast may proliferate slowly at the early stage
15 of growth if it is inoculated directly to the total fermented solution, which can delay the fermentation step. In detail, approximately 3 ~ 5 L of the fermented solution is collected from 100 L of the total solution, pre-cultivated for about 24 ~ 48 hours at 30°C after
20 approximately 0.9 ~ 1.5 g of yeast is inoculated (which is estimated to 0.2 ~ 0.3 g yeast / 1 L of the total fermented solution) and again inoculated to the total fermented solution.

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EXAMPLES

Practical and presently preferred embodiments of

the present invention are illustrated as shown in the following Examples.

However, it will be appreciated that those skilled in the art, on consideration of this disclosure, may make modifications and improvements within the spirit and scope of the present invention.

It is also natural for those skilled in the art to prepare the fermented liquor of the present invention by exploiting other procedures and methods instead of this procedure in the following Examples.

In the present invention, any fruit derived from *Acanthopanax sessiliflorus* and *Acanthopanax senticosus* may give the same products as shown in the experimental data and these two fruit will not be distinguished in following Examples. Therefore, the fruit of *Acanthopanax sessiliflorus* and the fruit of *Acanthopanax senticosus* are simply described as "fruit", "ogapi fruit" or "gasiogapi fruit".

Besides, it is clear for those skilled in the art that the fruit can be reduced to powder to prepare the fermented liquor of the present invention, depending upon convenience, although only natural fruit or dry fruit is utilized as it is in following Examples. Furthermore, it is natural for those skilled in the art that the natural fruit or the dry fruit can also be treated previously to extract effective constituents, filtrated immediately in the late stage of the (A) step

for preparation of fermented solution to exclude the
remained fruit and continued to proceed the (B) step of
fermentation as follows, even if the fruit is adopted
in the (A) step for preparation of fermented solution,
5 proceeded the next steps and filtrated after the
fermentation is completed, in following Examples.

**<Example 1> Production of fermented wine by using crude
fruit as main material**

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In order to prepare the fermented wine of the
present invention, crude Ogapi fruit was utilized as it
is and not dried.

Above all, the crude fruit of *Acanthopanax* was
15 washed by using pure water and wiped a little to remove
moisture on the surface. To 5 kg of crude fruit, 4.5 L
of pure water (9 L of pure water per 1 kg of crude
fruit) was added, adjusted to 24° Brix by dissolving
sugar and filled to approximately 50 L of fermented
20 solution. (the step for preparation of fermented
solution)

3 L of fermented solution prepared above was
separated and 15 g of commercially available yeast for
bread was inoculated. The culture solution inoculated
25 in the fermented solution was pre-incubated for 24
hours at 30°C and again inoculated into the whole
fermented solution prepared above. The resulting

fermented solution was processed at 20 ~ 25°C to be further fermented (the step for fermentation), and the alcohol concentration in the fermented solution was checked every 24 hours. When the alcohol concentration was over 12.0%, 200 ppm of potassium sulfite per 1 L of the fermented solution was added to the fermented solution in order to stop the reaction (the step for stopping the fermentation).

After stopping the fermentation, the resulting solution was filtrated and purified. As a result, the fermented wine of the present invention made from the crude Ogapi fruit as main material was manufactured.

<Example 2> Production of fermented wine by using crude fruit as main material

The fermented wine of the present invention was prepared to contain *Rosa davurica* and *Rhynchosia nolubilis* extract.

In dry *Rosa davurica*, leaves, roots, stems and fruits were washed clear, pulverized and then extracted through water heating for 12 ~ 15 hours at 70 ~ 95°C after 7-fold water more than the dry weight was added, with the extractor in which a refrigerating condenser was installed to prevent effective components from evaporation. Again, the extract obtained above was filtrated and condensed under reduced pressure to

prepare the *Rosa davurica* extract of the present invention.

Rhynchosia nolubilis was reduced to powder and extracted three times through circulation by using
5 hexane to remove lipid components. Then, the resultant was extracted through water heating for 5 hours at 90°C, repeatedly extracted three times and filtrated. The supernatant obtained above was concentrated under reduced pressure and dried under vacuum to prepare the
10 *Rhynchosia nolubilis* extract of the present invention.

In the step for preparation of fermented solution described in Example 1, the water extracts were added to 0.15 kg of *Rosa davurica* and 0.15 kg of *Rhynchosia nolubilis* per 1 kg of dry weight of the above-mentioned
15 natural fruit and proceeded by using the same procedure as demonstrated in Example 1. As a result, the fermented wine of the present invention made from the crude fruit of *Acanthopanax sp.* as main material was manufactured.

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<Example 3> Production of fermented wine by using dry fruit as main material I

In order to prepare the fermented wine of the
25 present invention, dry Ogapi fruit was utilized as raw material.

Above all, the crude fruit of *Acanthopanax sp.*

was dried in the shade to prepare the dry fruit.

Then, the dry fruit was washed by using pure water and wiped off to remove moisture on the surface. To 4 kg of dry fruit, 4.4 L of pure water (11 L of pure water per 1 kg of dry fruit) was added, adjusted to 24° Brix by dissolving sugar and filled to approximately 45 L of fermented solution. (the step for preparation of fermented solution)

The same procedure was performed as described in above-mentioned Example 1. As a result, the fermented wine of the present invention made from the dry fruit of *Acanthopanax* sp. as main material was manufactured.

<Example 4> Production of fermented wine by using dry fruit as main material II

In order to prepare the fermented wine of the present invention, the dry Ogapi fruit was utilized as raw material.

Above all, the natural fruit of *Acanthopanax* was dried in the shade to prepare the dry fruit.

The resulting dry fruit was washed by using pure water and wiped off to remove moisture. To 4 kg of dry fruit, 22 L of pure water (5.5 L of pure water per 1 kg of dry fruit) was added, adjusted to 24° Brix by dissolving sugar and extracted through water heating for 5 hours at 50°C primarily. Afterward, 22 L of pure

water was added, adjusted to 24° Brix by dissolving sugar and again extracted through water heating for 5 hours at 50°C secondarily. The extracted solution obtained above was filtrated to prepare approximately 5 45 L of the fruit extract (fermented solution). (the step for preparation of fermented solution)

The same procedure was accomplished as described in above-mentioned Example 1. As a result, the fermented wine of the present invention made from the fruit of *Acanthopanax* sp. as main material was 10 manufactured.

<Example 5> Production of fermented wine by using dry fruit as main material III

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In order to prepare the fermented wine of the present invention, the dry Ogapi fruit was utilized as raw material.

In the step for preparation of fermented solution as described in above-mentioned Example 4, the water 20 extract of *Rosa davurica* and the water extract *Rhynchosia nolubilis* prepared in Example 2, were added in the same content. Then, the same procedure was performed as described in Example 4. As a result, the 25 fermented wine of the present invention made from the fruit of *Acanthopanax* sp. as main material was manufactured.

INDUSTRIAL APPLICABILITY

As illustrated above, the present invention
5 provides the fermented wine made from fruits of
Acanthopanax sessiliflorus or *Eleutherococcus*
senticosus, which exploits the Ogapi fruit for
practical use even though it might be left alone or
discarded so far and includes effective constituents
10 more than typical wines

Therefore, the fermented wine of the present
invention is a milder wine similar to grape wine in the
characteristics and distinguished from other stronger
liquors and sustains the pharmaceutical efficacy of
15 *Acanthopanax* sp. Furthermore, the fermented wine of the
present invention is a new application for Ogapi fruit
which is so far left and discarded in the field and may
result in economical effect to increase the benefits of
farmhouses.

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Those skilled in the art will appreciate that the
conceptions and specific embodiments disclosed in the
foregoing description may be readily utilized as a
basis for modifying or designing other embodiments for
25 carrying out the same purposes of the present invention.

Those skilled in the art will also appreciate
that such equivalent embodiments do not depart from the

spirit and scope of the invention as set forth in the appended claims.